

Total No. of printed pages = 4

**CE 181305**

Roll No. of candidate

20/23

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2023

BINA CHOWDHURY CE (HONS) DEPARTMENT  
(GMT & GIPS)  
Azara, Halkhowapara,  
Guwahati-781017

**B.Tech. 3<sup>rd</sup> Semester End-Term Examination**

**Civil Engineering**

**ENGINEERING SURVEY - I**

**(New Regulation and New Syllabus)**

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any *four* from the rest.

1. Answer the following questions: (10 × 1 = 10)

- (i) In order to determine the natural features such as valleys, rivers, lakes etc., the surveying preferred is
- (a) Location Surveying                      (b) City Surveying  
(c) Topographical Surveying              (d) Cadastral Surveying
- (ii) The fundamental principle of surveying is to work from the
- (a) Whole to part                              (b) Part to whole  
(c) Lower level to higher level              (d) Higher level to lower level
- (iii) When the length of chain used in measuring distance is longer than the standard length, the error in measured distance will be
- (a) Positive error                              (b) Negative error  
(c) Compensating error                      (d) No error
- (iv) The obstacle, which obstructs vision but not chaining, is a
- (a) River    (b) Pond  
(c) Hill    (d) Road
- (v) The line in which the plane passing through the given point and the north and south poles intersects the surface of the earth, is called
- (a) Arbitrary meridian                      (b) True meridian  
(c) Magnetic meridian                      (d) Magnetic declination

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- (vi) The area of a plot of size 150 feet  $\times$  120 feet in Guwahati is
- (a) 5 Katha (b) 5 Katha 5 Lecha  
(c) 6 Katha (d) 6 Katha 5 Lecha
- (vii) In a whole circle bearing system S  $25^\circ 45'E$  corresponds to
- (a)  $154^\circ 15'$  (b)  $154^\circ 45'$   
(c)  $205^\circ 15'$  (d)  $205^\circ 45'$
- (viii) At the equator, the amount of dip is
- (a)  $90^\circ$  (b)  $0^\circ$   
(c)  $180^\circ$  (d)  $45^\circ$
- (ix) Contour interval is
- (a) Inversely proportional to the scale of the map  
(b) Larger for accurate works  
(c) Directly proportional to the flatness of ground  
(d) Larger if the time available is more
- (x) One of the tacheometric constants is additive, the other constant, is
- (a) Multiplying constant (b) Subtractive constant  
(c) Dividing constant (d) Indicative constant
2. (a) A 30 m steel tape was standardized at a temperature of  $20^\circ C$  and under a pull of 50 kg. The tape was used in a temperature of  $25^\circ C$  and under a pull of 11 kg. The cross sectional area of the tape is  $.02 \text{ cm}^2$ . It wt/length = 22 g/m,  $E = 2 \times 10^6 \text{ kg/cm}^2$ ,  $\alpha = 11 \times 10^6 \text{ per } ^\circ c$ . Find the correct horizontal distance. (8)
- (b) Discuss different types of obstacles in chaining. (7)
3. (a) In Chaining a line, what is the maximum slope (a) in degrees, and (b) as 1 in 'n', which can be ignored if the error from this source is not exceed 1 in 1000. (7)
- (b) The length of a survey line was measured with a 20 m chain and was found to be equal to 1200 meters. As a check, the length was again measured with a 25 m chain and was found to be 1212m. On comparing the 20 m chain with the test gauge, it was found to be 1 decimeter too long. Find actual length of the 25 m chain used. (8)

4. (a) The following consecutive readings were taken with a levelling instrument at an interval of 20m. 2.35, 1.95, 0.95, 2.1, 2.8, 2.1, 1.75, 0.85, 0.65, 1.65, 2.45(m). The instrument was shifted after fourth and eighth readings. The first reading was taken on BM of R.L. 55m. Find the R.L. of all the points by height of instruments method. (8)
- (b) Find the correction for curvature and for refraction for a distance of (i) 1200 meters and (ii) 2.48 km. (7)
5. (a) The following records are obtained in a traverse survey ABCDA, the length and bearing of the last line DA was not recorded. Compute the length and bearing of the line DA. (7)

AB	BC	CD
75.9	178.3	61.5
$30^{\circ}30'$	$105^{\circ}45'$	$215^{\circ}30'$

- (b) Two points A and B are on the opposite side of a hill. The tacheometer was set up at P on top of the hill and following readings were taken. Back sight reading at BM is 1.5 m and R.L. of BM is 400m. The multiplying constant and additive constant of the lens is 100 and 0 respectively. The staff was held normal to the line of sight.

Find :

- (i) The distance between A and B
- (ii) The gradients of lines PA and PB. (8)

Staff station    Vertical angle    Cross Hair readings (m)

A	$-10^{\circ}0'$	1.15	2.1	2.95
B	$-11^{\circ}0'$	0.95	1.55	2.4

6. (a) Derive the expression of height by reciprocal levelling with neat diagrams. (4 + 3)
- (b) The magnetic bearing of the Sun at noon is  $181^{\circ}20'$  from a station. Find the magnetic declination at the station. What will be the true bearing of a line observed from that station if the magnetic bearing is  $26^{\circ}30'$ . (4)
- (c) Distinguish between direct contouring and indirect contouring. (4)

7. (a) Discuss temporary adjustments of a Theodolite. (5)
- (b) The line of sight from two stations A and B just grazes the sea level. If the height of A and B above sea level are 100m and 150m respectively, find the distance AB. (5)
- (c) Discuss balancing of traverse can be done with Bowditch's Graphical Method. (5)

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